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Internal Letter

Rockwell International

Date . October 28, 1987

No. .

TO (Name, Organization, Internal Address)
. Those Listed
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FROM (Name, Organization, Internal Address, Phone)
. R. E. Richardella
. Pu Rec & Waste Proc Engr
. Building 130
. 5102

SUBJECT. ACTION DESCRIPTION MEMORANDUM FOR ACCELERATED RESIDUE RECOVERY PROJECT

Enclosed is the Action Description Memorandum (ADM) for the Accelerated Residue Recovery Project.

The ADM was transmitted to DOE, RFAO on October 15, 1987.

R. E. Richardella, Manager
Plutonium Recovery & Waste
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Enc.

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ADMIN RECORD
SW-A-003921

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ACTION DESCRIPTION MEMORANDUM
(HEALTH, SAFETY, AND ENVIRONMENTAL REMARK)
FOR
ACCELERATED RESIDUE RECOVERY PROJECT
Authorization 399911
October 1987

ROCKWELL INTERNATIONAL
North American Space Operations
Rocky Flats Plant
Golden, Colorado

Operating Contractor for
U.S. Department of Energy
Rocky Flats Area Office

Approved/Date

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WP&IE5-82:djp

I. CONCISE DESCRIPTION OF THE PROPOSED ACTION

The Accelerated Residue Recovery (ARR) Project provides new and upgraded facilities and processing equipment at the Rocky Flats Plant (RFP) to improve the plutonium recovery rate. The project consists of a number of tasks which can be categorized into head end processes, purification and conversion processes, and operational support projects.

Head end process improvements will provide mechanical and chemical processes to stage, treat, leach, and dissolve residues in preparation for subsequent purification. These process improvements include:

- Replacement and upgrade of dissolution systems.
- Replacement and upgrade of crushing and grinding systems.
- Replacement and upgrade of special recovery process.
- Replacement of existing casting furnaces with higher efficiency furnaces.
- Installation of new batch leaching recovery process system.
- Upgrade of metal oxidizing system.
- Modifications of residue storage and staging capability.
- Upgrades of radiation shielding.
- Upgrades of process controls and instrumentation.

Purification and conversion improvements will provide new capability and additional capacity to purify and convert residue streams to plutonium metal. Projects in this category include:

- Replacement and upgrade of anion exchange systems.
- Re-establishment of electrorefining capability.
- Replacement and upgrade of the hydrofluorination system.
- Replacement and upgrade of leaching system.
- Replacement and upgrade of waste solidification system.
- Upgrades of support laboratories.
- Upgrades of process controls and instrumentation.

Operational support projects for the above improvements include:

- New nonprocess areas to house offices and maintenance shops.

2

- Upgrades of various process area utility, ventilation, and alarm systems.

- Replacement of Raschig ring tanks with annular or shielded annular tanks.

II. LOCATION OF THE ACTION

The majority of the new facilities and equipment upgrades will be located in Building 771, with other changes occurring in Buildings 707, 776, and 371. The new nonprocess area for offices and shops will be located outside of Building 771. These buildings are shown on the attached map.

III. POTENTIAL ISSUES

A. ARCHAEOLOGY

The impact of this action on historic features in the area has been evaluated and it was found that the project does not infringe upon any known potentially eligible historic sites as defined in E.O. 11593 and 36 CFR 800 (Rocky Flats Plantsite Final Environmental Impact Statement [FEIS], DOE/EIS-0064, April 1980).

B. FLOODPLAINS/WETLANDS

This project is not located in either a floodplain or wetland as described by DOE regulations (10 CFR 1022).

C. RARE AND ENDANGERED SPECIES

No rare or endangered species (defined in 50 CFR 402) have been reported or found among the wildlife inhabiting or migrating through the Rocky Flats plantsite, including the buffer zone surrounding the plant.

D. CONSTRUCTION

All projects except the installation of new nonprocess areas will be constructed inside existing buildings and will have no environmental effect during the construction phase.

Construction activities connected with the installation of the nonprocess areas will be executed to minimize negative environmental impacts on air quality, water quality, and land use. Environmental effects due to excavation will be limited to the usual noises, dust, and land disturbance associated with construction projects. Excess soil and other waste materials will be removed to an existing sanitary landfill if it is not contaminated. Radioactive and/or hazardous material, if encountered, will be disposed of per existing DOE orders and RFP procedures.

E. OPERATION

1. DESCRIPTION

This project replaces aging plutonium processing facilities with similar processes using new and upgraded equipment. Upgrades include the addition of automated controls, replacement of high maintenance equipment, and stream-lining of processes. The future operational activities will be very similar to the current operational activities.

2. HAZARDS AND CONTROLS

a. Nuclear Criticality

Since there is potential for a nuclear excursion, strict physical and administrative controls have been established and are periodically audited by the Criticality Engineering group.

Critically safe spacing of storage containers is accomplished through specially designed storage racks and chainveyors.

Protection is also provided in the form of criticality drains in gloveboxes and 2-in.-high curbs across doorways to operating areas. These prevent liquid accumulation in anything other than a safe geometry slab.

All new fissile solution tanks installed will be critically safe, annular or shielded annular tanks.

b. Radiation

Three phases of radioactive contamination confinement are incorporated in the design of the buildings. These are classified as primary, secondary, and tertiary confinement areas. The primary Zone I confinement areas are the process enclosures (i.e., gloveboxes and storage vaults and their ventilation systems). Secondary Zone II confinement areas are the operating area compartments and their ventilation systems. The tertiary Zone III confinement areas are the building structure and its ventilation system.

The exhaust from Zone I confinement areas is filtered through a minimum of four stages of High Efficiency Particulate Air (HEPA) filtration, in which airborne particulate radioactive contaminants are removed. The exhaust from Zone II and III confinement areas is filtered through a minimum of two stages of HEPA filtration. All supply air inlets contain one stage of HEPA filtration in case of a flow reversal to minimize the potential for radioactive particulates escaping to the environment.

An air pressure differential is maintained between the zones to ensure no radioactive particulates are released to the environment and to provide adequate ventilation in the buildings. The most negative pressure exists in Zone I areas (typically negative 1 in. H_2O), the next highest pressure exists in Zone II areas (approximately negative 0.30 in. H_2O),

5

and Zone III areas are kept at only a slight negative pressure to atmosphere.

The alpha, beta, and gamma radiation in these processes is generated by isotopes of plutonium, uranium, and americium. The alpha, beta, and low-energy gamma radiation are absorbed by the enclosure (glovebox or container) holding the radioactive material. Exposure to high-energy gamma rays and neutrons is controlled by lead, water walls, high density plastic shielding, thick concrete shielding, distance, and by limiting the time of exposure.

Selective alpha air monitors (SAAMs) exist in all plutonium process areas and detect any release of airborne alpha radioactivity. When alpha radiation is detected, the SAAMs actuate alarms and warning lights. High levels of neutron radiation are detected by the criticality alarms throughout the process areas. These alarms initiate immediate evacuation of the building.

Many of the tasks comprising this project will reduce radiation exposure to personnel. The reduction will be accomplished by:

- Replacing many existing gloveboxes with new gloveboxes meeting higher standards for radiation protection.

- Enhancement of shielding on several existing gloveboxes.

- Reducing material residence time by improved process flow.

- Increased system automation.

- Relocation of offices away from process areas.

c. Explosion

A minor explosion hazard exists with the acetylene gas supply for the Atomic Absorption (AA) spectrometer unit included in the support laboratory upgrade. A leak of this gas at a rate sufficient to form a significant accumulation of an explosive concentration is considered highly unlikely because of the small supply tank, the room ventilation rate, and the use of pipe and fittings approved for flammable gas applications.

The ion exchange columns used in the upgraded anion exchange system will utilize a higher efficiency resin. Since less resin will be present, the explosion hazard will be reduced.

d. Fire

This project will reduce fire hazards as follows:

- Replacement of the existing glovebox overheat alarm system in Building 771 with a new system which meets current design standards.

- Providing an improved facility for the oxidizing of plutonium metal fines.

- Reduction of fuel loading in Building 771 by replacement of fire retardant coated combustible shielding with noncombustible shielding.

e. High Voltage or Current

Voltages and currents utilized in this building addition are typical of those used in normal industry. All electrical design work for nuclear facilities at RFP is performed in accordance with standard industrial safety requirements as defined by National Fire Protection Association (NFPA) codes, the National Electrical Code (NEC), Occupational Safety and Health Administration (OSHA) regulations, and by the Department of Energy (DOE) Orders for nuclear facilities.

f. Toxic or Corrosive Materials and Carcinogens

The processes within this project use a variety of acids, caustics, and corrosive salts. However, no new chemical hazards will be introduced by this project. Process chemicals are enclosed within gloveboxes and process piping.

The Industrial Hygiene group reviews all engineering packages to identify toxic material hazards and establishes physical and administrative controls needed to ensure that worker exposures to toxic substances meet OSHA Health and Safety Standards. The Hazardous Materials Control group gathers data on all chemicals used and ensures compliance with the OSHA Hazards Communications Standard.

g. Mechanical Hazards

Mechanical hazards during construction of the new nonprocess support areas will be typical of those normally encountered in building construction (e.g., the handling of prestressed concrete sections, steel beams, presence of excavation and material-handling equipment). All work will be performed in accordance with OSHA requirements for worker protection as a minimum.

Mechanical hazards present in the operation of the upgraded facilities will be typical of any industrial facility. No new types of mechanical hazards will be created by this project. Administrative controls and physical placement of guards as required will be used to protect workers where potential mechanical hazards are present.

3. POSTULATED ACCIDENTS

Overall risk from postulated accident scenarios will be reduced as a result of this project. The postulated accident scenarios which are affected by this project are discussed below.

The crushing and grinding facility upgrade will reduce risk of a release of contamination by reducing the number of bagouts of material. In

7

addition, worker exposures will be reduced because duration of exposure will be shortened.

The casting furnaces replacement will reduce risk in the event of building damage due to an external event. The more efficient furnaces will generate less plutonium in the readily dispersible oxide form.

The metal oxidizing upgrade will reduce risk by providing better enclosed and controlled conditions for the oxidizing of plutonium metal fines.

The leaching system upgrade will reduce both the risk of contamination and worker exposures by providing a better shielded glovebox with provision for maintenance access without the use of supplied air.

The installation of an AA spectrometer in the support laboratory will reduce the likelihood of a spill by eliminating the transportation of solution samples between buildings for analysis. There will be a minor increase in explosion risk due to the acetylene gas used for this work.

The new nonprocess areas will reduce nonproduction worker risk for most of Building 771 accident scenarios by reducing office space in the process areas, thus decreasing the number of people present.

The risk of accidents due to contamination spill and criticality will be reduced by replacing the existing Raschig ring filled tanks with annular or shielded annular tanks. The replacement will lessen the reliance on administrative controls and improve accountability.

The risk from an earthquake scenario will be reduced because all process equipment installed under this project will be designed to meet current seismic criteria.

4. USE OF RESOURCES

Resources used during operation include water, fossil fuels, chemicals, and electricity. The utilization of resources in the upgraded facilities will be essentially the same as in the existing facilities.

5. HEALTH, SAFETY & ENVIRONMENTAL DESIGN REQUIREMENTS

This project will conform to the requirements of the DOE Facilities General Design Criteria, DOE Order 6430.1.

6. REQUIRED EFFLUENT AND EMISSION PERMITS

No major discharges are anticipated as part of the normal operation for these facilities. All gaseous emissions are scrubbed (when required) and extensively filtered. Liquid wastes are treated onsite at the two liquid waste treatment buildings, and the final product water is recycled. Solid wastes are appropriately packaged and shipped offsite to acceptable disposal sites.

The waste solidification process being replaced in this project is currently identified as a unit subject to Resource Conservation and Recovery Act (RCRA) regulation. The RFP RCRA permit will require modification when this unit is replaced.

An application may be required to the EPA under the Clean Air Act as implemented by 40 CFR 61.07 to construct or modify an existing DOE facility with the potential to release radionuclides to the atmosphere.

F. SITE RESTORATION AFTER DECOMMISSIONING

Site restoration and decommissioning activities will be handled as described in the Rocky Flats Plantsite FEIS, DOE/EIS-0064, April 1980.

IV. AGENCIES AND/OR PERSONS CONSULTED, INCLUDING COORDINATION WITH FEDERAL, STATE, REGIONAL, AND LOCAL AGENCIES

The conceptual design report for this action will be reviewed by Financial Plans & Reports, Facilities Engineering, Facilities Project Management, Telecommunications, Construction Management & Inspection, Plutonium Operations, Industrial Engineering, Safeguards, Plant Security, Plant Protection, Fire Protection Engineering, and the Health, Safety & Environment Engineering Review Team. The Health, Safety & Environment team consists of representatives of Health Physics, Environmental Management, Safety Analysis, Industrial Hygiene, Criticality Engineering, and Industrial Systems and Safety Engineering.

This ADM was prepared by Facilities Engineering, Safety Analysis, and Environmental Management.

V. ADDITIONAL DOCUMENTATION

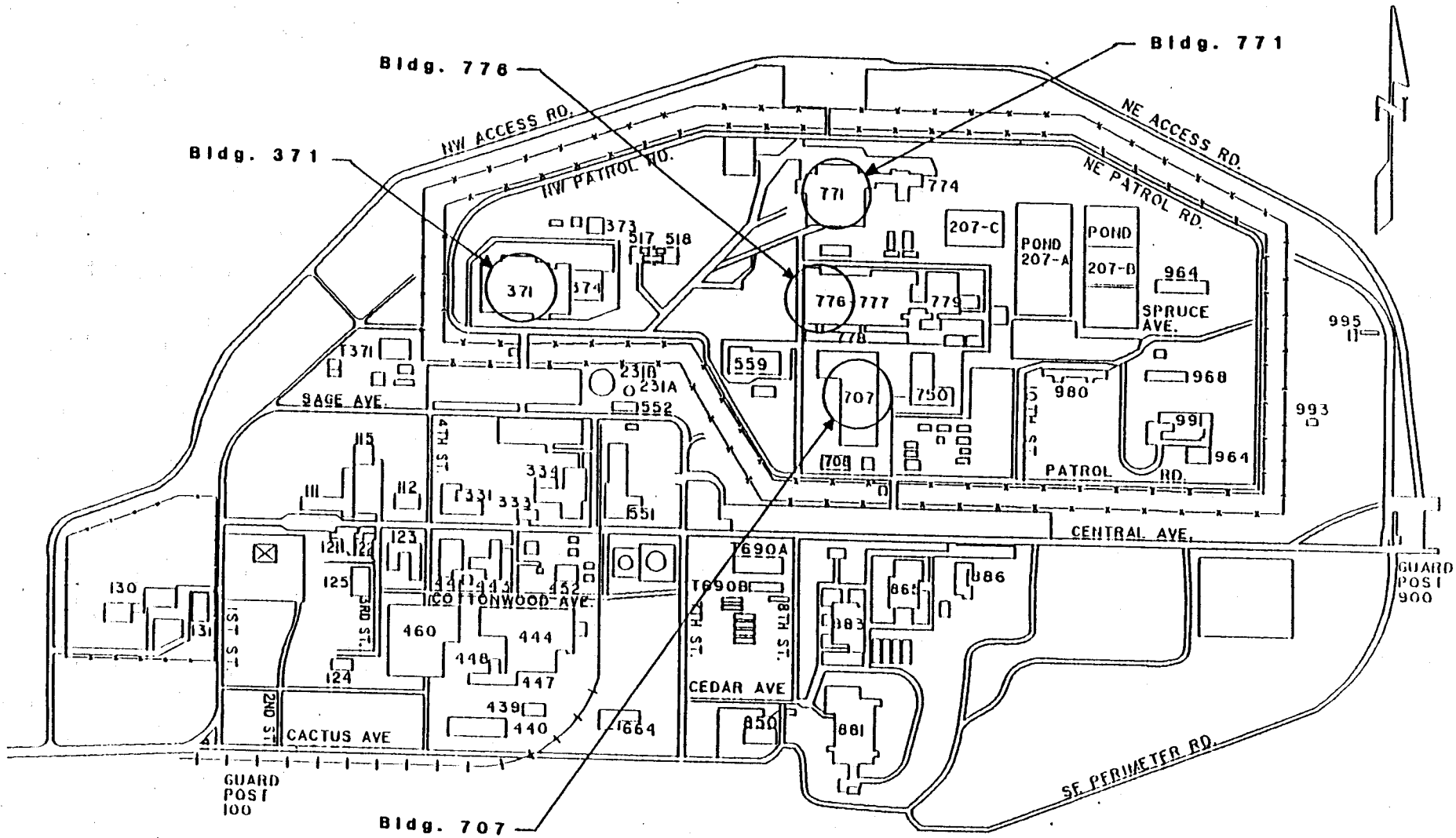
The tasks comprising this project are replacements, relocations, and upgrades of existing or known processes on plantsite. No significant change in environmental impact will occur and no additional NEPA documentation is necessary.

VI. ADDITIONAL INFORMATION

A. The total estimated cost for this project is $49.7 million.

B. The first year of funding will be FY 1989.

ACCELERATED RESIDUE RECOVERY PROJECT



ROCKY FLATS AREA PLOT PLAN

PROJECT LOCATION

2/10